

## COLOR VIDEO PROJECTION SYSTEM EMPLOYING REFLECTIVE LIQUID CRYSTAL DISPLAY DEVICES

### ABSTRACT OF THE DISCLOSURE

An image projector (8, 68) includes a light source (14) that illuminates a  
5 three-path reflective LCD assembly (25, 74) that produces images for projection by  
a projection lens (27). The light source produces S-polarized light rays that are  
received by a spectrally selective wave plate (36) that changes a first wavelength  
range of light to P-polarized light rays (34) and transmits without polarization  
change second and third wavelength ranges of light. A plate-type transflective  
10 polarizing beam splitter (40) transmits the P-polarized first wavelength range light  
rays and reflects S-polarized second and third wavelength range light rays (34). The  
P-polarized first wavelength range light rays transmit through a field lens (42<sub>1</sub>) and  
impinge on a first reflective LCD light valve (26<sub>1</sub>). The S-polarized second and  
third wavelength range light rays strike a pleochroic filter (48), which divides them  
15 into second and third wavelength range light rays (44, 46) that propagate through  
field lenses (42<sub>2</sub>, 42<sub>3</sub>) and impinge on respective second and third LCD light valves  
(26<sub>2</sub>, 26<sub>3</sub>). The light rays impinging on dark state pixels on the first LCD light valve  
are reflected without polarization direction change and return toward the light  
source along their original paths. However, the light rays impinging on illuminated  
20 state pixels on the first LCD light valve are reflected with a 90° change in  
polarization direction and are reflected toward the projection lens by the  
transflective polarizing beam splitter. The light rays impinging on illuminated state  
pixels on the second and third LCD light valves are reflected with a 90° change in  
polarization direction, are recombined by the pleochroic filter, and transmit through  
25 the transflective polarizing beam splitter toward the projection lens.